PH GB 000193WO PCT
MAT. DOSSIER

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : H04N 7/16, 7/24, 5/00

A1

(11) International Publication Number: WO 00/27120

(43) International Publication Date: 11 May 2000 (11.05.00)

(21) International Application Number: PCT/US99/24861

(22) International Filing Date: 22 October 1999 (22.10.99)

(30) Priority Data:
09/183,553 29 October 1998 (29.10.98) US

(71) Applicant: W CHANNEL SYSTEMS, INC. [US/US]; 3565 Ryder Street, Santa Clara, CA 95051 (US).

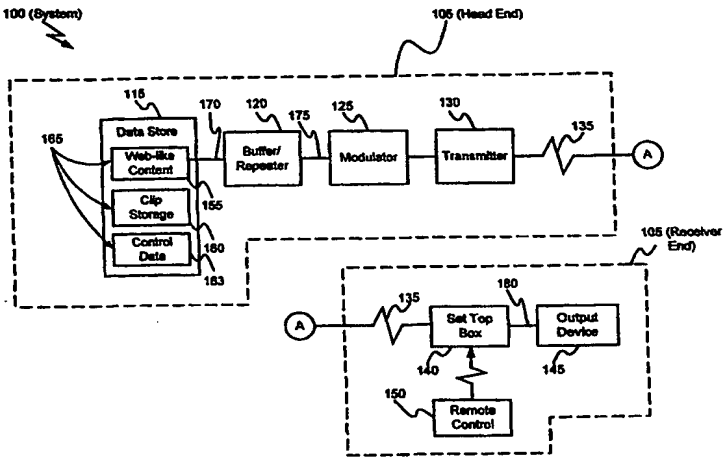
(72) Inventors: CHU, Phillip; 879 Lansdown Court, Sunnyvale, CA 94087 (US). LIN, George, G.; 20724 Scofield Drive, Cupertino, CA 95014 (US). ZHANG, David, Z.; 10 De Sabia Road, #916, San Mateo, CA 94402 (US).

(74) Agents: SOCKOL, Marc, A. et al.; Graham & James LLP, 600 Hansen Way, Palo Alto, CA 94304-1043 (US).

(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: SYSTEM AND METHOD FOR TRANSMITTING AND RECEIVING DATA IN A NETWORK



(57) Abstract

A transmission system and a receiver system enable an internet experience with enhanced content regulation and simplicity. The transmission system comprises a buffer memory storing data-to-be-transmitted which contains channel information, a transmitter for transmitting the stored data based on the channel information and a repeater coupled to the buffer memory and to the transmitter for repeatedly sending the stored data from the buffer memory to the transmitter. The receiver system comprises a receiver for receiving data packets being transmitted on the multiple channels, a device coupled to the receiver for extracting a data packet from the received data packets based on a comparison of the received data packets and desired packet identification information. The receiver system further comprises a browser coupled to the device for enabling presentation of an extracted data packet and for enabling selection of an option and a control engine coupled to the browser for managing the desired packet identification information based on the extracted data packet and based on option selection. The transmission system may offer multiple versions of the service, such as a basic, an extended and a deluxe version. The receiver system may be configured to receive a version based on a subscription package.

BNSDOCID: <WO 0027120A1 | >

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	**ES**	Spain	**LS**	Lesotho	**SI**	Slovenia
AM	Armenia	**FI**	Finland	**LT**	Lithuania	**SK**	Slovakia
AT	Austria	**FR**	France	**LU**	Luxembourg	**SN**	Senegal
AU	Australia	**GA**	Gabon	**LV**	Latvia	**SZ**	Swaziland
AZ	Azerbaijan	**GB**	United Kingdom	**MC**	Monaco	**TD**	Chad
BA	Bosnia and Herzegovina	**GE**	Georgia	**MD**	Republic of Moldova	**TG**	Togo
BB	Barbados	**GH**	Ghana	**MG**	Madagascar	**TJ**	Tajikistan
BE	Belgium	**GN**	Guinea	**MK**	The former Yugoslav Republic of Macedonia	**TM**	Turkmenistan
BF	Burkina Faso	**GR**	Greece			**TR**	Turkey
BG	Bulgaria	**HU**	Hungary	**ML**	Mali	**TT**	Trinidad and Tobago
BJ	Benin	**IE**	Ireland	**MN**	Mongolia	**UA**	Ukraine
BR	Brazil	**IL**	Israel	**MR**	Mauritania	**UG**	Uganda
BY	Belarus	**IS**	Iceland	**MW**	Malawi	**US**	United States of America
CA	Canada	**IT**	Italy	**MX**	Mexico	**UZ**	Uzbekistan
CF	Central African Republic	**JP**	Japan	**NE**	Niger	**VN**	Viet Nam
CG	Congo	**KE**	Kenya	**NL**	Netherlands	**YU**	Yugoslavia
CH	Switzerland	**KG**	Kyrgyzstan	**NO**	Norway	**ZW**	Zimbabwe
CI	Côte d'Ivoire	**KP**	Democratic People's Republic of Korea	**NZ**	New Zealand		
CM	Cameroon			**PL**	Poland		
CN	China	**KR**	Republic of Korea	**PT**	Portugal		
CU	Cuba	**KZ**	Kazakstan	**RO**	Romania		
CZ	Czech Republic	**LC**	Saint Lucia	**RU**	Russian Federation		
DE	Germany	**LI**	Liechtenstein	**SD**	Sudan		
DK	Denmark	**LK**	Sri Lanka	**SE**	Sweden		
EE	Estonia	**LR**	Liberia	**SG**	Singapore		

BNSDOCID: <WO 0027120A1 I >

SYSTEM AND METHOD FOR TRANSMITTING AND RECEIVING DATA IN A NETWORK

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to data transmission systems, and more particularly provides a system and method for transmitting and receiving data in a network.

2. Description of the Background Art

Cable television and internet television offer viewers both entertainment and intellectual value. Cable television allows a viewer to select a show from a broad range of simultaneous broadcasts. A viewer may review a broadcast guide, select a particular program and then tune-in to the proper channel. Alternatively, a viewer may flip through the channels until a program appears interesting. Internet television allows a user to "surf" a network, by connecting a set top box to the network and to the viewer's television. The viewer interacts with the set top box, which responsively establishes communications channels with connected network servers. Accordingly, the viewer can receive and review an almost infinite amount of information.

Governments are concerned about providing internet television because its content is not regulated easily. A viewer can connect to any one of millions of servers to receive unregulated data. Thus, it is difficult for a government to control what each viewer sees on the internet. Governments prefer cable television, because its content can be supervised. For example, in China, the television broadcast industry is regulated by the Ministry of Radio, Film and Television (MRTF). The MRTF has licensed over 2000 cable television broadcasters, the three largest broadcasters being located in Shanghai, Beijing and Tianjin. The MRTF sets cable television subscription fees, allowing for variations based on locality, and regulates cable television broadcast

BNSDOCID: <WO 0027120A1 >

content of each ministry. Accordingly, a system and method are needed that provide a user with an internet experience, but with the content regulation capability of cable television.

BNSDOCID: <WO 0027120A1 | >

SUMMARY OF THE INVENTION

The present invention provides an advanced Internet & digitized video content delivery system through which application programs can be quickly sent to millions of households in an affordable way over an existing cable TV infrastructure. The system a transmitter and a receiver.

The receiver includes an advanced TV set-top box which receives Internet program broadcast from the transmitter. The box can receive many application channels being broadcast from the transmitter simultaneously. The box can intelligently filter out irrelevant information and display contents in anti-alias mode that reduce the flicking effects of an ordinary TV set. With a remote control, a user can extract the application channel of interests, surfing them at fast speeds. The receiver has full Internet browsing capability. At the heart of the box is the core technology that enables faster and more efficient content delivery. This key technology allows various Internet applications to be delivered to a TV set at the same time. Users can thus surf among Internet applications channels with a remote control which resembles a regular one for TV. The receiver receives control information from the transmitter, receives Internet contents from the transmitter, caches most recent/related information for the current active channel, formats and displays selected contents on TV with-Anti-flicking technology, sets initial/default application channel contents, manages local & incoming Internet files in an optimizing way, process user requests through a remote controller, and manages local memory content .

The transmitter is responsible for obtaining, reformatting and delivering Internet contents. The transmitter schedules the application programs and stages them to a master insertion system through which the programs are broadcast. The transmitter also manages user profiles and program packages. The transmitter obtains targeted contents from Internet, formats contents for insertion, schedule content delivery, sets up transmitter configurations, updates box configurations, updates transmitter configurations, allocates application channels, manages contents to be

BNSDOCID: <WO 0027120A1 >

delivered, and manages user profile and package. The transmitter complies fully with the DVB/DAVIC standard, supports constellations up to 256-QAM, formats the equalized data which is then fed into a DVB/DAVIC compliant synchronization block, de-interleaver, Reed_Solomon FEC, and de-randomizer. The final error-corrected output is delivered in MPEG-2 transport format.

As indicated by the claims, the present invention provides a transmission system and a receiver system. The transmission system comprises a buffer memory storing data-to-be-transmitted, which contains channel information, a transmitter for transmitting the stored data based on the channel information, and a repeater coupled to the buffer memory and to the transmitter for repeatedly sending the stored data from the buffer memory to the transmitter. The receiver system comprises a receiver for receiving data packets being transmitted on multiple channels, a device coupled to the receiver for extracting a data packet from the received data packets based on a comparison of the received data packets and desired packet identification information, a browser coupled to the device for enabling presentation of an extracted data packet, and for enabling selection of an option, and a control engine coupled to the browser for managing the desired packet identification information based on the extracted data packet.

As further indicated by the claims, the present invention further provides a transmitter method and a receiver method. The transmitter method comprises storing data-to-be-transmitted, which contains channel information, selecting a transmission channel based on the channel information, and transmitting repeatedly the stored data on the selected transmission channel. The receiver method comprises receiving a data packet being transmitted on a first channel, comparing the data packet against desired packet identification information to determine if the data packet is desired, selecting the data packet if the data packet is desired, and managing the desired packet identification information based on a selected data packet.

With this system, cable operators can deliver additional value-added service to customers by delivering interesting and entertaining contents quickly to millions of households. Consumers can obtain the Internet experience without a computer that is difficult to use and expensive to buy. Moreover, content providers can accomplish much higher exposure and faster vehicle to effectively deliver contents.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram illustrating a network system, in accordance with the present invention;

FIG. 2 is a block diagram illustrating details of data being transmitted;

FIG. 3 is a block diagram illustrating a start page window;

FIG. 4 is a block diagram illustrating a stock page window;

FIG. 5 is a block diagram illustrating details of the buffer/repeater of FIG. 1;

FIG. 6 is a block diagram illustrating details of the set top box of FIG. 1;

FIG. 7 is a block diagram illustrating a start page data packet contained within the data being transmitted of FIG. 2;

FIG. 8 is a block diagram illustrating a content page data packet within the data being transmitted of FIG. 2 for a first page;

FIG. 9 is a block diagram illustrating a content page data packet within the data being transmitted of FIG. 2 for all other pages;

FIG. 10 is a block diagram illustrating a control page data packet within the data being transmitted of FIG. 2;

FIG. 11 is a block diagram illustrating a method of transmitting one-way data to viewer systems;

FIGs. 12A, 12B and 12C are a block diagram illustrating a method of receiving one-way data at a viewer system; and

FIG. 13 is a block diagram illustrating a control page.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention enables a head end system to repeatedly broadcast all data one-way to viewer systems. Each viewer system can tune-in to the channels to retrieve the data. Because the head end system repeatedly broadcasts all available data, the viewer system need only know from what channel to extract the specific data desired. A viewer/user selects the specific data desired, and the viewer system automatically extracts the selected data from the data being broadcast. The selected data can then be presented on the viewer/user's television or on any other presentation device.

FIG. 1 is a block diagram illustrating a network system 100 in accordance with the present invention. The network system 100 includes a head end 105 coupled via a transmission line 135 to a receiver end 110. The head end 105 includes a data store 115, a buffer repeater 120 coupled via a first communications channel 170 to the data store 115, a modulator 125 coupled via a second communications channel 175 to the buffer/repeater 120, and a transmitter 130 coupled to the modulator 125 and to the transmission line 135. It will be appreciated that the terms "channel," "line" and "bus" are being used herein interchangeably to include any mode of communicating information from one node to another.

The data store 115 stores data-to-be-transmitted 165. Example data-to-be-transmitted 165 includes web-like content 155 such as HTML data, multimedia data, pictures, files, applets, ActiveX™ control, etc. and includes clip storage 160 such as movies, music, slide shows, etc. The data-to-be transmitted 165 may be loaded onto the data store 115 using conventional techniques, such as via a floppy disk, via a compact disk or via a connection to a network, e.g., the wide area network commonly referred to as "The Internet." A head end manager (not shown) may select the data-to-be-transmitted 165, and may input the data 165 to the data store 115.

It will be appreciated that the data-to-be-transmitted 165 may include any data that is manageable by a browser engine (625, FIG. 6) at the receiver end 110. It will

BNSDOCID: <WO 0027120A1 I >

be further appreciated that the data-to-be-transmitted 165 is preferably first converted to "one-way data." That is, one-way data 165 preferably does not request the receiver end 110 to send information back to the head end 105. For example, the system 100 does not implement a two-way communications link or handshaking protocol between the head end 105 and receiver end 110. Alternatively, the data 165 may include and the receiver end 110 may ignore such requests. It will be still further appreciated that the data store 115 may also contain data that is not to be transmitted.

The data-to-be-transmitted 165 may also include control data 163, such as the control data 163 (FIG. 13). The control data 163 is used when the head end 105 offers multiple versions of the service, such as a deluxe version, an extended version and a standard version. Based on the version selected/purchased by the viewer/user, the control data 163 enables the receiver end 110 to receiver the selected/purchased version.

Generally, the buffer/repeater 120 receives or retrieves the data-to-be-transmitted 165 from the data store 115. The buffer/repeater 120 stores and repeatedly transmits the data 165 via the second communications channel 175 to the modulator 125. In the preferred embodiment, the buffer/repeater 120 is sufficiently large to store all the data-to-be-transmitted 165. The buffer/repeater 120 is described in detail with reference to FIG. 5.

The modulator 125 receives the data-to-be-transmitted 165 from the buffer/repeater 120, and converts the data 165 from a digital to an analog signal. It will be appreciated that, for example, a QAM-64 or QAM-1024 modulation scheme may be used. The QAM-64 modulator 125 transmits data at forty (40) megabits (Mb) per second or five (5) megabytes (MB) per second. Accordingly, the QAM-64 modulator 125 can send one hundred megabytes (100MB) of data in twenty (20) seconds. It will be appreciated that the QAM-1024 modulator 125 sends data twenty (20) times faster than the QAM-64 modulator 125, and thus could send the 100MB of

BNSDOCID: <WO 0027120A1 >

data in one (1) second. The modulator 125 forwards the analog data-to-be-transmitted 165 to the transmitter 130.

The transmitter 130 transmits the analog data-to-be-transmitted 165 to the transmission line 135 on multiple (N) channels, preferably, using MPEG-2 format and protocol, although another format and protocol may alternatively be used. The transmitter 130 may be based on the type of transmission line 135. For example, if the transmission line 135 includes a coaxial cable, transmitter 130 may include a coax interface. Similarly, if the transmission line 135 includes a satellite link, the transmitter 130 may include a microwave frequency interface. It will be appreciated that the buffer/repeater 120, modulator 125 and transmitter 130 preferably transmit data 165 at the same speed, so that no data 165 is lost or compromised.

FIG. 2 is a block diagram illustrating details of data-being-transmitted 200 by the transmitter 130. As illustrated, the data-being-transmitted 200 includes multiple packets 205 being transmitted on multiple (N) channels. More particularly, the data-being-transmitted 200 includes multiple packets 205 being transmitted on channel 0, multiple packets 205 being transmitted on channel 1, etc. In the embodiment described herein, there is 256 channels 210, and each packet 205 contains 188 bytes of information with the first byte being used for synchronization. Four different types of packets 205 are described in detail with reference to FIGs. 7-10.

Referring again to FIG. 1, the receiver end 110 includes a set top box 140 coupled to the transmission line 135, an output device 145 coupled via a third communications channel 180 to the set top box 140, and a remote control 150 coupled via a fourth communications channel (e.g., a radio frequency link) 185 to the set top box 150. Generally, the set top box 140 receives input from the remote control 150 indicating the specific data the viewer desires to be presented on the output device 145. It will be appreciated that the specific data from which the viewer can select may depend on control data 163 being sent. For example, if the viewer subscribes to a basic version instead of a deluxe version, the viewer may not be enabled to select

RNSDOCID: <WO 0027120A1 I >

certain data. Using control data 163 is described in greater detail below. The set top box 140 tunes-in to the channels 210 to receive all data-being-transmitted 200 on transmission line 135. Based on the selection by the viewer, the set top box 140 extracts and forwards the specific data desired to the output device 145, which accordingly presents (displays, plays, etc.) the data. The set top box 140 is described in greater detail with reference to FIG. 5.

FIG. 3 is a block diagram illustrating a start page window 300, which includes a title 310 and several options 305 from which to select content pages or specific data to be presented. For example, the several options 305 include "Weather," "Stocks," "Classifieds," "Personals," "Movies," "Real Estate," "Music" and "Other Multimedia Data." The start page window 300 further includes a cursor 315 which is controlled by the remote control 150. Using the remote control 150 and cursor 315, a viewer/user (not shown) can select one of the several options 305. As stated above, the options 305 available may depend on the control data 163 being transmitted. It will be appreciated that the packet 205 containing the start page data may be transmitted on a predetermined channel, e.g., channel 0, known to the set top box 140. Thus, the set top box 140 would always be capable of finding the starting point within the data-being-transmitted 200 at which to begin its presentation.

In the embodiment with multiple versions of services, the set top box 140 is configured to first obtain the control data 163, which indicates the particular start page window 300 to present. The set top box 140 receives the control data 163 behind the scenes. The control data 163 includes a set top box address and a corresponding version of service. The set top box 140 recognizes its version of service, and accordingly extracts the channel and page IDs for the start page window 300. FIG. 13 is a block diagram illustrating details of control data 163. Control data 163 includes a physical channel and logical channel map 685, a list 1310 of set top boxes to be enabled, a list 1315 of set top boxes to be disabled, a list 1320 of set top boxes to be modified, and start page identification information per version information 1325. The

BNSDOCID: <WO 0027120A1 >

list 1310 of set top boxes to be enabled and the list 1320 of set top boxes to be modified includes version of service information for each set top box. Thus, the start page can easily be determined for each set top box 140.

The channel and page IDs for retrieving the page data for the content pages identified by the options 305 are also stored in the start page data. Thus, upon selection of an option 205, the set top box 140 will know from which channel to retrieve the page data for the selected option 205. To increase speed, the set top box 140 may retrieve and cache the page data for all content pages identified by options 305. Retrieving page data for a selectable option 305 is described in greater detail with reference to FIGs. 12A, 12B and 12C.

FIG. 4 is a block diagram illustrating a content page 400 for stocks, which is presented upon selection of the "Stocks" option 305 from window 300 (FIG. 3). For example, the content page 400 includes a title "Stock Page" and the options 405 "NYSE," "ASE," "Mutual Funds," "FAQ," "Previous Page" and "Start Page." It should be noted that, in this example, previous page and start page indicate the same page. The content page 400 further includes the cursor 315, still controlled by the remote control 150. As stated above, the stock page data will be sent on a channel identified within the start page data. Accordingly, upon selection of the stock page option 205, the set top box 140 will know the channel having the stock page data, and will retrieve the stock page data therefrom. Examples of these links between a current page and a possible future page are shown and described with reference to FIGs. 7-10.

FIG. 5 is a block diagram illustrating details of the buffer/repeater 120. The buffer/repeater 120 includes a processor 505, such as an Intel Pentium® microprocessor or a Motorola Power PC® microprocessor, coupled to a communications bus 525. The buffer/repeater 120 further includes a buffer memory 510 for storing the data-to-be-transmitted 165, and working memory 515 storing a repeater engine 520, each coupled to the communications bus 525. The working memory 515 may be random access memory (RAM), read-only memory (ROM), hard

BNSDOCID: <WO 0027120A1 I >

disk, etc. or combinations thereof. The buffer/repeater 120 further includes a receiver interface 170 coupled to the communications bus 525 and via communications channel 170 to the data store 115 for receiving data-to-be-transmitted 165 from the data store 115. The buffer repeater 120 also includes an output interface 535 coupled to the communications bus 525 and via communications channel 175 to the modulator 125 for transmitting the data-to-be-transmitted 165 to the modulator 125.

The repeater engine 520 retrieves or receives the data-to-be-transmitted 165 via the receiver interface 530 and stores the data 165 in the buffer memory 510. The repeater engine 520 repeatedly transmits the data 165 in the buffer memory 510 via the output interface 535 to the modulator 125. It will be appreciated that the repeater engine 520 is configured to send the data 165 at the same speed that the modulator 125 sends the data 165, so that no data 165 is lost or compromised. Although the repeater engine 520 is being described as software, one skilled in the art will recognize that the repeater engine 520 may be implemented in hardware such as in an application-specific integrated circuit (ASIC).

One skilled in the art will recognize that the buffer/repeater 120 may further include an operating system (not shown), which may be stored in ROM 515, for controlling processing by the processor 505. One skilled in the art will further recognize that the buffer/repeater 120 may also include additional elements, such as network connections, additional memory, additional processors, LANs, input/output lines for transferring information across a hardware channel, the Internet or an intranet, etc. One skilled in the art will also recognize that the programs and data may be received by and stored in the buffer/repeater 120 in other ways. For example, the receiver interface 530 may include a computer-readable storage medium (CRSM) reader (not shown) such as a magnetic disk drive, hard disk drive, magneto-optical reader, CPU, etc. for receiving data 165 from a computer-readable storage medium (CRSM) such as a magnetic disk, a hard disk, a magneto-optical disk, RAM, etc. Similarly, the buffer/repeater 120 may include a compact disk (CD) and CD-ROM

BNSDOCID: <WO 0027120A1 >

drive or a tape and tape drive for repeatedly sending data 165 to the modulator 125.

FIG. 6 is a block diagram illustrating details of the set top box 140. The set top box 140 includes a processor 605, such as an Intel Pentium® microprocessor or a Motorola Power PC® microprocessor, coupled to a communications bus 630. The set top box further includes read-only memory 607, cache memory 610 and working memory 620, each coupled to the communications bus 630. It will be appreciated that the working memory 620 may be random access memory (RAM), read-only memory (ROM), hard disk, etc. or combinations thereof. It will be appreciated that the cache memory 610 may be any fast read/write memory. The set top box 140 further includes a receiver and demodulator 635, a remote control signal receiver 640, a field-programmable gate array (FPGA) 645, a graphics card 650 and an output device interface 655, each also coupled to the communications bus 630.

The receiver and demodulator 635 is coupled to the transmission line 135 for receiving all data-being-transmitted 200 on the transmission line 135. The receiver and demodulator 635 tunes-in to each of the channels, receives the data 200, and forwards the data 200 to the FPGA 645. It will be appreciated that the receiver and demodulator 635 may be hardware or software. The FPGA 645 de-packetizes the data 200 into the packets 205. In the embodiment having multiple versions of services, the FPGA 645 compares the channel and page IDs of the data packet 205 against known control data channel and page IDs 609 stored in ROM 607 to determine whether the data packet 205 includes control data 163. If the data packet 205 is a control packet, then the FPGA 645 compares an address 680 dedicated to the set top box 140, which is stored in the ROM 607, against lists of addresses within the packet 205 indicating set top boxes 140 to be enabled, modified and disabled. If the address matches one on the list of a set top box 140 to be enabled or modified, then the FPGA 645 stores new start page IDs 675 and optionally a new map 685 corresponding physical channels to logical channels. If the address 680 matches an address of a set top box 140 to be

BNSDOCID: <WO 0027120A1 >

disabled, then the FPGA 645 disables itself by setting a flag or by deleting the start page IDs 675.

In the embodiment having only one version of service, the FPGA 645 or ROM 607 may store the start page channel and page IDs 675 without storing control data IDs 609. Accordingly, the start page is known. No comparisons need be performed. In yet another embodiment, control data 163 may be contained within the start page indicating whether to enable or disable a set top box 140.

If the data packet 205 does not contain control data 163, then the FPGA 645 compares the data packet 205 either against the start page IDs 675 identifying start page data or against acceptance tables 624 identifying specific data desired by the set top box 140. It will be appreciated that the start page IDs 675 may be transferred into the acceptance tables 624, and a comparison performed with the data within the acceptance tables. If a match occurs, then the FPGA 645 forwards the start page data or specific data desired to the workspace memory 620 or cache memory 610, as described below. Although the set top box 140 is being described as having an FPGA 645, one skilled in the art will recognize that any device, hardware or software, for performing de-packetization and comparisons may alternatively be used.

At system 100 start up (post configuration by control data 163), the FPGA 645 compares the data 200 against the start page IDs 675 stored in the FPGA 645. If the data 200 matches, then the FPGA 645 transmits the start page data to the working memory 622 as page data 622. The FPGA 645 also compares the data 200 against current page and future page acceptance tables 624 stored in working memory 620 and generated by control engine 623. Generation of the acceptance tables 624 is described below. If the data 200 corresponds to data identified by the acceptance tables 624, then the FPGA 645 sends the data to the working memory 620 as page data 622 or to the cache memory 610 as future data 615, as described below. At start up, the acceptance tables 624 are effectively empty, although the start page IDs 675 may be transferred to the acceptance tables 624 so that the start page can be retrieved.

BNSDOCID: <WO 0027120A1 >

After storing the start page data in the working memory 620 as page data 622, the control engine 623 retrieves link page information from the start page data. This link page information identifies selectable pages corresponding to the selectable options 305 (FIG. 3) and may identify other components of the current page (such as pictures, applets, music, clips, etc.). The control engine 623 adds the link page information to the acceptance tables 624. More particularly, the control engine 623 adds each distinct link page message into a current page table 624 if it corresponds to the current page and into a future page table if it corresponds to a page selectable from the current page. Accordingly, the FPGA 645 will send the page data for the future pages identified by the link page information in the future page acceptance table 624 to the cache memory 610 as future data 615. The FPGA 645 will send the page data for the current page identified by the link page information in the current page acceptance table 624 to the working memory as page data 622.

The browser engine 625 uses the page data 622 to generate network pages for display on the output device 145. The data may be HTML data, which is interpreted by the browser engine 625 to generate the network page. The browser engine 625 operates in conjunction with the graphics card 650 to generate a bitmap display and refresh schedule. The graphics card 650 sends the bitmap display via the output device interface 655 to the video output device 145 for presentation. The browser engine 625 may operate in conjunction with a multimedia engine (not shown) to generate music data, movie data, etc., which is sent to the output device 145 for presentation. It will be appreciated that the browser engine 625 may include the multimedia engine. The browser engine 620 displays a cursor, such as the cursor 315 (FIG. 3) on the video output device 145, and monitors signals from the remote control 150 via the remote control signal receiver 640. Based on these signals, the browser 620 manipulates the position of the cursor 620, recognizes "click" events selecting options 305/405, and informs the control engine 623 of the option 305/405 selection. The remote control 150 enables a viewer/user to manipulate the position of the cursor

BNSDOCID: <WO 0027120A1 >

315, to scroll the network page being displayed, to select options 305/405, etc. The signals are transmitted from the remote control 150 via the remote control signal receiver 640 to the browser engine 625 for processing.

Upon selection of an option 305/405, the control engine 623 reorganizes the page data 622 and future data 615 as available and generates new current and future page acceptance tables 624. More particularly, if available, the control engine 623 transfers the data corresponding to the selected page from the future data 615 in cache memory 615 to the page data 622 in the working memory 620. Transferring data from the cache memory 610 increases the speed of processing the viewer's request. The control engine 623 transfers the link page information for the requested page from the future page acceptance table 624 to the current page acceptance table 624. Thus, if the future data 615 does not contain the data needed for the requested page, the FPGA 645 will transfer and store the page data for the requested page to the working memory 620 as page data 622.

Again, the control engine 623 retrieves the link page information from the new page data 622, and will build current and future page acceptance tables 624. The FPGA 645 resumes comparing and sending the appropriate data to the working memory 620 as page data 622 and to the cache memory 610 as future data 615 as described above. The browser engine 625 generates the new network page, e.g., the stock page window 400.

FIG. 7 is a block diagram illustrating an instance of a data packet 205 for generating the start page window 300 (FIG. 3), referred to herein as data packet 700. Data packet 700 includes two (2) start/end bits 705, a one (1) bit version 710, a five (5) bit page type 715, a one (1) byte channel ID 720, a two (2) byte page ID 730, a two (2) byte size 735, a one (1) byte number of link pages 740, a number (N) of three (3) byte link pages 750, and a payload 755. The page type 715 indicates the type of data, such as text, picture, movie, music, etc., contained in the packet 700. The channel ID 720 identifies the logical channel 210 in which the data packet 700 is being sent. It

RNSDOCID: <WO 0027120A1 I >

will be appreciated that many packets on many logical channels 210 may be sent on a single carrier wave at a single frequency range. The channel ID 720 also indicates at which frequency this channel 210 should be included. When sorting packets 205, the FPGA 645 compares the channel ID 720 with channel IDs contained in the acceptance table 624 or with the start page IDs 675. The page ID 730 identifies the particular packet within the channel 210 as belonging to a particular network page, in this case as belonging to the start page window 300. Again, when sorting packets 205, the FPGA 645 compares the page ID 730 with page IDs contained in the acceptance tables 624 or with the start page IDs 675. The size 735 indicates the packet size including the header for the start page window 300. The number of link pages 740 indicates the number of other pages, corresponding to options 305, that can selected from the start page. The link pages 750 include the channel ID and page ID for the selectable pages. The payload 755 includes the page data for the start page.

According to the above protocol, the system 100 can have up to 256 channels, wherein each channel can have up to 65K pages, and wherein each page can contain up to 65K bytes. It will be appreciated that, in an embodiment, channels 2-32 will be in a first frequency, channels 33-64 will be in a second frequency, channels 65-96 will be in a third frequency, channels 97-128 will be in a fourth frequency, channels 129-160 will be in a fifth frequency, channels 161-192 will be in a sixth frequency, channels 193-224 will be in a seventh frequency and channels 225-256 will be in an eighth frequency. Channel 1 will include the start page or the control page (FIG. 13) which identifies the start page, and will be available in all frequencies. In any case, a known channel will provide the starting point for entry into the data-being-transmitted 200.

FIG. 8 is a block diagram illustrating an instance of a data packet 205 for generating a content page (first packet for the page), referred to herein as data packet 800. The first page content page refers to every page other than the start page. Similar to the data packet 700, the data packet 800 includes two (2) start/end bits 805,

BNSDOCID: <WO 0027120A1 | >

a one (1) bit version 810, a five (5) bit page type 815, a one (1) byte channel ID 820, a two (2) byte page ID 825, a two (2) byte size 830, a one (1) byte number of link pages 835, a number (N) of three (3) byte link pages 840, and a payload 845.

FIG. 9 is a block diagram illustrating another instance of a data packet 205 for a content page (other packets for the same page), referred to herein as data packet 900. Data packet 900 does not need the same header information as the data packet 800. Data packet 900 includes two (2) start/end bits 905, a one (1) bit version type 910, five (5) bits reserve 915, a one (1) byte channel ID 920, a two (2) byte page ID 925 and a 183 byte payload 930.

FIG. 10 is a block diagram illustrating yet another instance of a data packet 205 for control data 163, referred to herein as data packet 1000. The control data 163 may be part of the start page. The data packet 1000 includes two (2) start/end bits 1005, a one (1) bit version 1010, a five (5) bit page type 1015, a one (1) byte channel ID 1020, a two (2) byte page ID 1025, a two (2) byte size 1030, a one (1) byte number of link pages 1035 equal to one, only one (3) byte link page 1040, and a 177 byte payload 755. The payload 755 includes the two (2) byte Box ID identifying the set to box address 680, a seven (7) byte time of day identifying the current time for synchronization purposes, and like information. The payload 755 also includes the elements listed in FIG. 13.

It will be appreciated that the control page packet 1000 may include protocol information (not shown) for retrieving packets 205. Thus, the set top box 140 may first retrieve the control packet 1000 on a known channel 210 using a known protocol. The control packet may inform the set top box 140 of the new and improved protocol to use when downloading all future packets 205. The control packet 1000 may then request selection of an options package. Selection may be based on a preset signal hardwired in the set top box 140. Based on the embodiment used, either the control packet 1000 will indicate the start page to use or the set top box 140 will know the start page window 300 to use.

BNSDOCID: <WO 0027120A1 >

As stated above, the control data 163 may identify the start page. The user contacts the head end manager, e.g., via telephone, and request an options package, e.g., standard, extended or deluxe. Selection of a particular version indirectly selects the particular start page that will be available to the viewer/user. For example, the standard package may offer only some options 305. The extended version may offer more options 305. The deluxe package may offer all options 305. Similarly, the different packages may offer different options 405 in content pages. If the system 100 uses multiple versions of services, then control page IDs 609 will identify the control data 163, the control data 163 will identify the selected start page, the selected start page will identify the selectable content pages, etc.

FIG. 11 is a flowchart illustrating a method 1100 for transmitting data 200. Method 200 begins with the viewer/user (not shown) or an input device (not shown) in step 1105 obtaining one-way data 165, preferably, already packetized. The data store 115 in step 1110 stores the one-way data 165. In step 1115, the data store 1115 forwards or the buffer/repeater 120 retrieves the one-way data 165, up to the maximum capacity of the buffer memory 510. The buffer/repeater 120 in step 1120 forwards the one-way data 165 to the modulator 125. The modulator 125 in step 1125 converts the data 165 from digital to analog, and in step 1130 forwards the data 165 to the transmitter 130. The transmitter 130 in step 1135 transmits the data 165, as data-being-transmitted 200, on transmission line 135.

System 100 in step 1140 determines whether to end the method 1100, e.g., because the system 100 has been turned off. If so, then method 1100 ends. Otherwise, the buffer/repeater 120 in step 1145 determines whether the data 165 stored in the data store 115 has been modified or replaced. If so, then method 1100 returns to step 1115 to obtain the new data 165 to transmit. Otherwise, the repeater engine 520 in the buffer/repeater 120 in step 1150 determines whether the data-to-be-transmitted 165 in the data store 115 is greater than the buffer memory 510 capacity. If not, then all data-to-be-transmitted 165 has been transferred to the buffer memory 510. Thus, the

BNSDOCID: <WO 0027120A1 | >

method 1100 returns to step 1120 to repeat the transmission process (i.e., at least steps 1120-1135). Otherwise, the repeater engine 520 determines whether the cycle is over. For example, if the buffer memory 510 capacity is 5MB and the data-to-be transmitted 165 is 100MB, then the repeater engine 520 determines that twenty (20) packages must be transmitted to complete the cycle. If the cycle is not over, then the method 1100 returns to step 1115 for the buffer/repeater 120 to obtain the next package for transmission. If the cycle is over, i.e., the transmitter 130 just transmitted the twentieth package, then the repeater engine 510 in step 1160 resets the cycle, and returns to step 1115 to retrieve the first package for transmission.

FIG. 12A is a flowchart illustrating a method 1200 for retrieving desired data from the data-being-transmitted 200. Method 1200 begins with the receiver and demodulator 635 in step 1201 tuning-in and receiving a data packet 205 from the data-being-transmitted 200 on transmission line 135, and forwarding the data 200 to the FPGA 645. The FPGA 645 in step 1202 de-packetizes the data 200 into data packets 205. The FPGA 645 in step 1203 determines whether the data packet 205 received contains control data 163 addressed to this set top box 140. This determination may be performed by comparing the data packet 1300 against the known control data IDs 609 stored in the ROM 607 and comparing the address 680 to addresses within the data packet 205.

If the data packet 205 contains control data 163 addressed to the set top box 140, then the FPGA 645 in step 1204 performs the requested control. For example, if the requested control is to enable or to disable the set top box 140, then the FPGA 645 sets the appropriate flag. If the control is to modify the existing version of service, then the FPGA 645 stores the new map 685 and start page IDs 675. Method 1200 then returns to step 1201. If the data packet 205 does not contain control data 163, then the FPGA 645 in step 1206 determines whether the receiver 140 has previously been enabled, i.e., whether a map 685 and start page IDs 675 have been previously stored in the FPGA 645. If not, then the method 1200 returns to step 1201. Otherwise, the

BNSDOCID: <WO 0027120A1 >

FPGA 645 in step 1207 determines whether the system 100 has just been started up. If so, then the FPGA 645 in step 1208 transfers the start page IDs 675 to the acceptance tables 624 and method 1200 jumps to step 1209. If not, then method 1200 jumps directly to step 1209. In step 1209, the FPGA 645 compares the data packets 205 with the acceptance tables 624. Method 1200 then continues with FIG. 12B.

The FPGA 645 in step 1210 determines whether any data packets 205 match the comparison criteria (i.e., the channel and page IDs in the acceptance tables 624). If not, then the method 1200 returns to step 1201. Otherwise, the FPGA 645 in step 1211 determines whether the matching data packet 205 corresponds to the current page or to a future page. If the matching data packet 205 corresponds to the current page, then the FPGA 645 in step 1212 sends the packet to the working memory 620 as page data 622. The control engine 623 in step 1213 generates acceptance tables from the current page data 622, by retrieving and storing the channel and page IDs from the header of the data packet within the page data 622. The browser 625, graphics card 650 and output device interface 655 in step 1214 present the current page on the output device 145 and enable option 305/405 selection. Method 1200 then continues with step 1224. If the matching data packet 205 corresponds to a future page, then the FPGA 645 in step 1215 sends the packet 205 to the cache memory 610 as future data 615. Method 1200 then continues with step 1224 in FIG. 12C.

In step 1224, the browser 625 determines whether an option 305/405 has been selected and, if selected, informs the control engine 623. If not, then the method 1200 returns to step 1202. Otherwise, the control engine 623 in step 1225 determines if the option 305/405 selected was the "End" option (not shown). If the end option was selected, then method 1200 ends. Otherwise, the control engine 623 in step 1228 transfers the current page data 622 to the cache memory as future data 615 (in case the "previous page" option 405 is selected). The control engine 623 in step 1228 also transfers the acceptance tables 624 to the cache memory 610 as future data 615 (again, in case the previous page option 405 is selected).

BNSDOCID: <WO 0027120A1 I >

The control engine 623 in step 1230 determines whether the data for the selected option 305/405 has been stored in the cache memory 610 as future data 615. If so, then the control engine 623 in step 1236 transfers the data for the selected option 305/405 from the future data 615 to the current page data 622. The control engine 623 in step 1238 cleans up the cache memory 610 and the working memory 620, by erasing the obsolete acceptance tables 624 and the obsolete page data 622 from working memory 620 and the obsolete future data 615 from cache memory 610. Method 1200 then returns to step 1220. If not stored in future data 615, the control engine 623 in step 1232 generates a new acceptance table 624 for the selected option 305/405, by adding the channel and page IDs for the selected page to the acceptance table 624. The control engine 623 in step 1234 cleans up the cache memory 610 and the working memory 610, by erasing all obsolete acceptance tables 624 and page data from working memory 610 and all future data 615 from cache memory 610. Method 1200 then returns to step 1202.

Returning back to page 1202 means that the set top box 140 must wait for the data 200 for the option 305/405 selected to arrive before it can be displayed. If the data 200 being waited for is a movie, then because of the length of the movie, it may take several minutes before the start of the movie data 200 resumes. Accordingly, a schedule of movies may be transmitted more often so that the set top box can inform the viewer/user of the start time for or count-down until the next movie. Further, the set top box 140 will switch to the channel 210 right before the movie starts.

One skilled in the art will recognize that the set top box 140 may include an operating system (not shown), which may be stored in working memory 620, for controlling processing by the processor 605. One skilled in the art will further recognize that the set top box 140 may also include additional elements, such as network connections, additional memory, additional processors, LANs, input/output lines for transferring information across a hardware channel, the Internet or an intranet, etc. One skilled in the art will also recognize that the programs and data may

RNSDOCID: -WO 00271201A1 1 -

be received by and stored in the system in many ways. For example, a computer-readable storage medium (CRSM) reader (not shown) such as a magnetic disk drive, hard disk drive, magneto-optical reader, CPU, etc. may be coupled to the communications bus 630 for reading a computer-readable storage medium (CRSM) such as a magnetic disk, a hard disk, a magneto-optical disk, RAM, etc. Programs and data may be entered into the set top box 140 via the CRSM reader.

The foregoing description of the preferred embodiments of the present invention is by way of example only, and other variations and modifications of the above-described embodiments and methods are possible in light of the foregoing teaching. Although the network sites are being described as separate and distinct sites, one skilled in the art will recognize that these sites may be a part of an integral site, may each include portions of multiple sites, or may include combinations of single and multiple sites. Further, components of this invention may be implemented using a programmed general purpose digital computer, using application specific integrated circuits, or using a network of interconnected conventional components and circuits. Connections may be wired, wireless, modem, etc. The embodiments described herein are not intended to be exhaustive or limiting. The present invention is limited only by the following claims.

BNSDOCID: <WO 0027120A1 I >

WHAT IS CLAIMED IS:

1. A receiver system, comprising:

a receiver for receiving data packets being transmitted on multiple channels;

a device coupled to the receiver for extracting a data packet from the received data packets based on a comparison of the received data packets and desired packet identification information;

a browser coupled to the device for enabling presentation of an extracted data packet, and for enabling selection of an option; and

a control engine coupled to the device for managing the desired packet identification information based on the extracted data packet.

2. The system of claim 1, wherein the multiple channels correspond to a single frequency.

3. The system of claim 1, wherein the multiple channels correspond to multiple frequencies.

4. The system of claim 1, wherein each data packet includes identification information for comparison against the desired packet identification information to determine whether to extract the data packet.

5. The system of claim 4, wherein the identification information includes a channel ID and a page ID for comparison against the desired packet identification information.

RNSDOCID: <WO 0027120A1 | >

6. The system of claim 5, wherein the device stores the extracted data packet in current page memory.

7. The system of claim 1, wherein the extracted data packet includes link information.

8. The system of claim 7, wherein the control engine adds the link information to the desired packet identification information to determine whether to extract other data packets.

9. The system of claim 8, wherein the device extracts other data packets and stores the other data packets in future page memory.

10. The system of claim 1, wherein the extracted data packet includes control data.

11. The system of claim 10, wherein the control data identifies a start page.

12. The system of claim 1, wherein the extracted data packet includes multimedia data.

13. The system of claim 1, wherein the desired packet identification information includes acceptance tables containing current page information and link information.

ANSDOCID: <WO 0027120A1 I >

14. The system of claim 1, further comprising a signal receiver interface coupled to the browser for receiving a signal selecting the option.

15. The system of claim 1, wherein the control engine manipulates the desired packet identification information upon selection of the option.

16. A receiver method comprising the steps of:

receiving a data packet being transmitted on a first channel;

comparing the data packet against desired packet identification information to determine if the data packet is desired;

selecting the data packet if the data packet is desired; and

managing the desired packet identification information based on a selected data packet.

17. The method of claim 16, wherein the first channel corresponds to a first frequency.

18. The method of claim 17, further comprising the step of receiving a second data packet on a second channel corresponding to the first frequency.

19. The method of claim 17, further comprising the step of receiving a second data packet on a second channel corresponding to a second frequency.

RNSDOCID: <WO 0027120A1 | >

20. The method of claim 17, wherein the data packet includes a channel ID and a page ID, and wherein the step of comparing includes comparing the channel ID and page ID against the desired packet identification information.

21. The method of claim 17, wherein each data packet includes link information.

22. The method of claim 21, wherein the step of managing the desired packet information includes adding the link information to the desired packet identification information.

23. The method of claim 22, further comprising the steps of receiving other data packets, and selecting another data packet from the other data packets based on the link information.

24. The method of claim 23, further comprising receiving a signal selecting the option.

25. The method of claim 24, further comprising the step of manipulating the desired packet identification information upon selection of the option.

26. A receiver system comprising:

means for receiving a data packet being transmitted on a first channel;

means for comparing the data packet against desired packet identification information to determine if the data packet is desired;

means for selecting the data packet if the data packet is desired; and

BNSDOCID: <WO 0027120A1 | >

means for managing the desired packet identification information based on a selected data packet.

27. A computer-readable storage medium storing program code for causing a computer to perform the steps of:

receiving a data packet being transmitted on a first channel;

comparing the data packet against desired packet identification information to determine if the data packet is desired;

selecting the data packet if the data packet is desired; and

managing the desired packet identification information based on a selected data packet.

28. A receiver system, comprising:

a receiver for receiving a data packet containing data, identification information, and linking information corresponding to at least one option;

first memory for storing current page data packets;

second memory for storing potential page data packets;

third memory for storing desired current page packet information;

fourth memory for storing desired potential page packet information;

a device coupled to the receiver, the third memory and the fourth memory for comparing the identification information against the desired current page packet information and against the desired potential page packet information, coupled to the first memory for transferring the received data packet to the first memory according to the comparison of the identification information and the desired current page information, and coupled to the second memory for transferring the received data

RNSDOCID: <WO 0027120A1 >

packet to the second memory according to the comparison of the identification information and the desired potential page packet information;

a browser coupled to the first memory for presenting the data for a current page data packet stored in the first memory; and

a control engine coupled to the first memory, the third memory and the fourth memory for manipulating the desired current page packet information and the desired potential page packet information based on the current page data packet stored in the first memory.

29. The system of claim 28, wherein the identification information includes a channel ID and a page ID.

30. The system of claim 28, wherein the device includes an FPGA.

31. The system of claim 28, further comprising a signal receiver interface coupled to the browser for receiving a signal selecting the option.

32. The system of claim 31, wherein the control engine manipulates the desired current page packet information upon selection of the option.

33. The system of claim 32, wherein the control engine retrieves from the second memory the data packet corresponding to the linking information which corresponds to the selected option, and stores it in the first memory.

34. The system of claim 32, wherein the second memory does not store the data packet corresponding to the linking information which corresponds to the selected

BNSDOCID: <WO 0027120A1 >

option, and wherein the control engine adds the linking information to the third memory as desired current page packet information.

35. The system of claim 34, wherein, upon selection of the option, the control engine cleans up the first, second, third and fourth memories.

36. The system of claim 28, wherein, upon system start-up, the third memory stores start page information as the desired current page packet information.

37. A receiver method, comprising:

receiving a data packet containing data, identification information, and linking information corresponding to at least one option;

comparing the identification information against desired current page packet information and against the desired potential page packet information;

transferring the received data packet to first memory as a current page data packet when the comparison of the identification information matches the desired current page information;

transferring the received data packet to second memory when the identification information matches the desired potential page packet information;

presenting the data for a current page data packet stored in the first memory; and

manipulating the desired current page packet information and the desired potential page packet information based on the current page data packet stored in the first memory.

RNSDOCID: <WO 0027120A1 | >

38. The method of claim 37, wherein the identification information includes a channel ID and a page ID.

39. The method of claim 38, further comprising receiving a signal selecting the option.

40. The method of claim 39, wherein manipulating occurs upon selection of the option.

41. The method of claim 40, further comprising retrieving from the second memory the data packet corresponding to the linking information which corresponds to the selected option, and storing it in the first memory.

42. The method of claim 40, further comprising adding the linking information to the desired current page packet information.

43. The method of claim 42, wherein, upon system start-up, the desired current page packet information includes start page information.

44. A receiver method, comprising:

means for receiving a data packet containing data, identification information, and linking information corresponding to at least one option;

means for comparing the identification information against desired current page packet information and against the desired potential page packet information;

BNSDOCID: <WO 0027120A1 I >

means for transferring the received data packet to first memory as a current page data packet when the comparison of the identification information matches the desired current page information;

means for transferring the received data packet to second memory when the identification information matches the desired potential page packet information;

means for presenting the data for a current page data packet stored in the first memory; and

means for manipulating the desired current page packet information and the desired potential page packet information based on the current page data packet stored in the first memory.

45. A computer-readable storage medium storing program code for causing a computer to perform the steps of:

receiving a data packet containing data, identification information, and linking information corresponding to at least one option;

comparing the identification information against desired current page packet information and against the desired potential page packet information;

transferring the received data packet to first memory as a current page data packet when the comparison of the identification information matches the desired current page information;

transferring the received data packet to second memory when the identification information matches the desired potential page packet information;

presenting the data for a current page data packet stored in the first memory; and

manipulating the desired current page packet information and the desired potential page packet information based on the current page data packet stored in the first memory.

46. A transmission system, comprising:

a buffer memory storing data-to-be-transmitted, which contains channel information;

a transmitter for transmitting the stored data based on the channel information; and

a repeater coupled to the buffer memory and to the transmitter for repeatedly sending the stored data from the buffer memory to the transmitter.

47. A transmission method, comprising:

BNSDOCID: <WO 0027120A1 >

storing data-to-be-transmitted, which contains channel information;

selecting a transmission channel based on the channel information; and

transmitting repeatedly the stored data on the selected transmission channel.

48. A system comprising:

receiving data packets for multiple instances of a presentation;

receiving a program guide, which contains data for offering selection of one of the instances and containing identification information for enabling extraction of each of the instances;

using the data to present the program guide;

enabling selection of an instance presented by the program guide;

receiving the selection of an instance;

using the identification information to extract data packets for the selected instance from the received data packets; and

presenting dynamically the data packets for the selected instance.

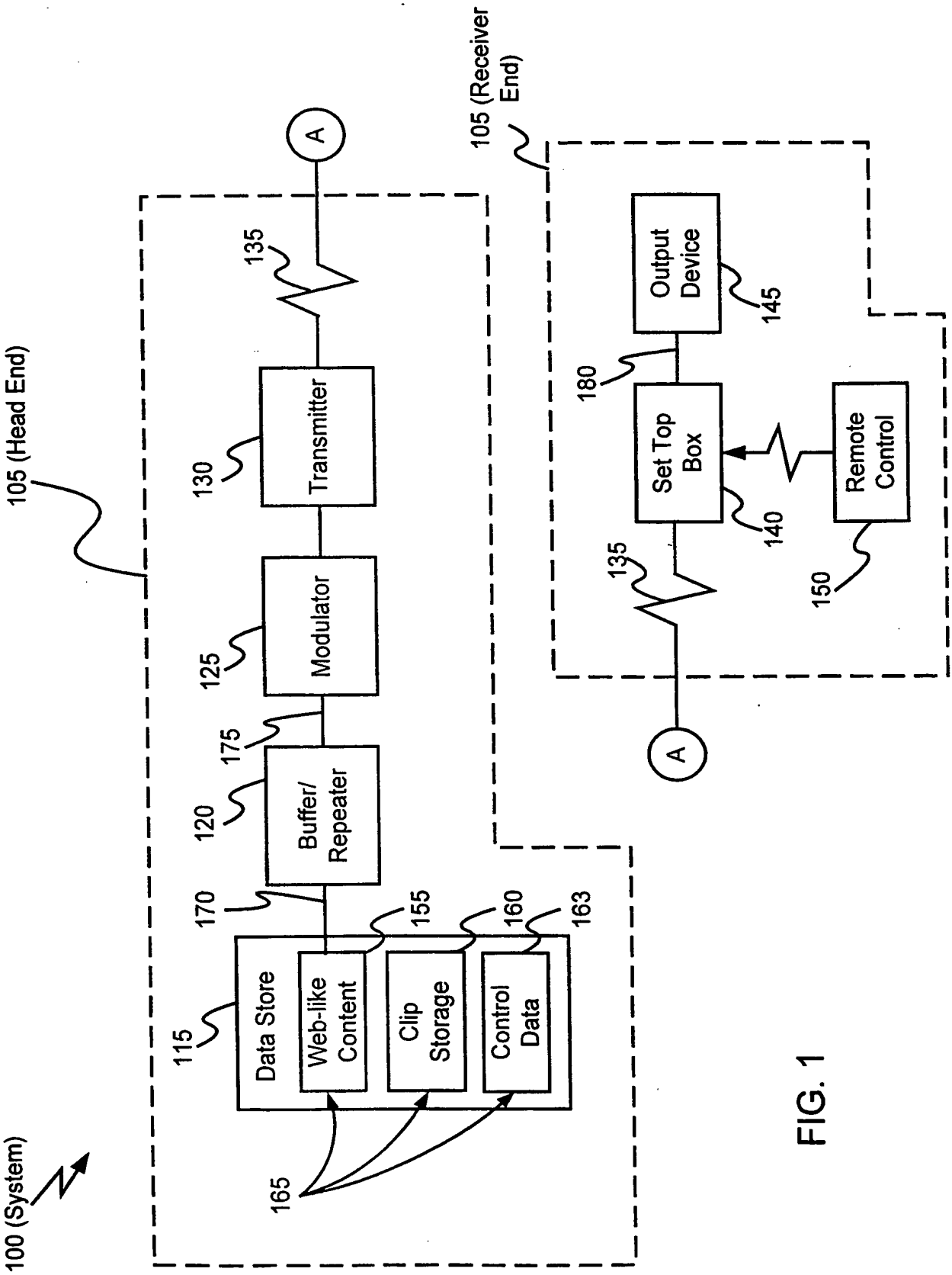


FIG. 1

BNSDOCID: <WO 0027120A1 | >

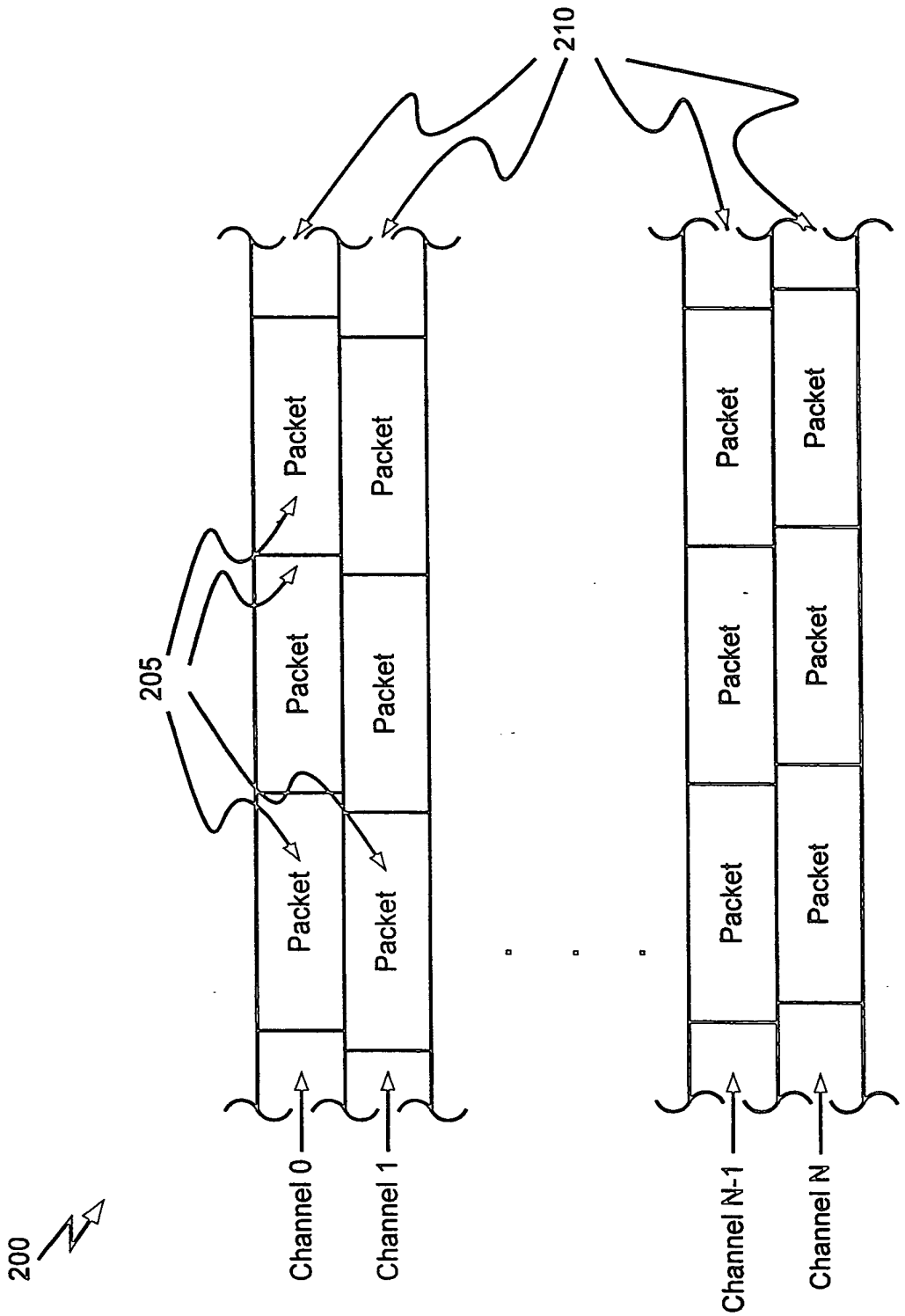


FIG. 2

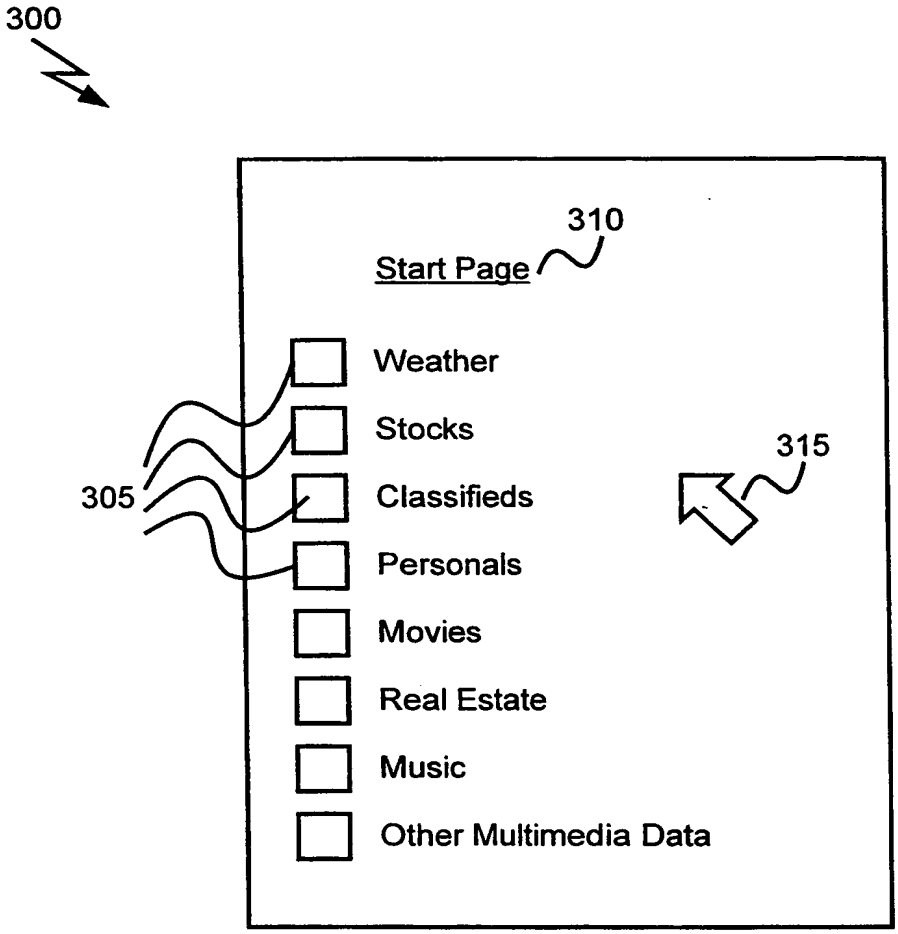

300
310
Start Page
Weather
Stocks
Classifieds
Personals
Movies
Real Estate
Music
Other Multimedia Data
305
315

FIG. 3

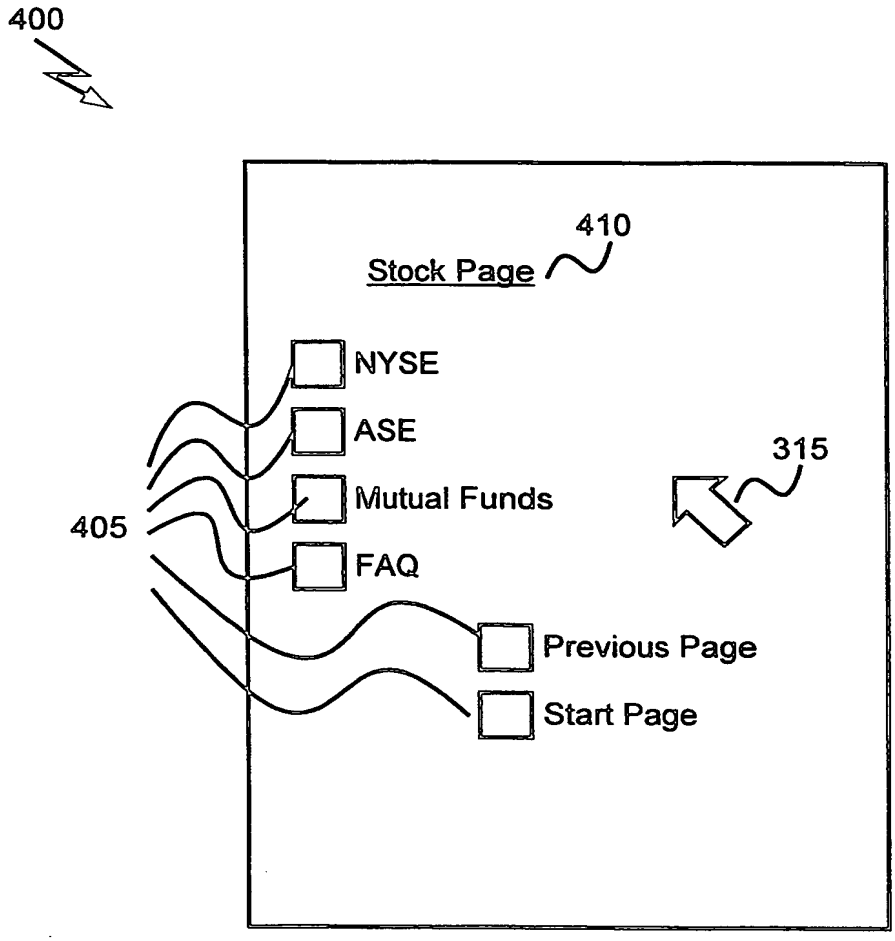


FIG. 4

BNSDOCID: <WO 0027120A1 >

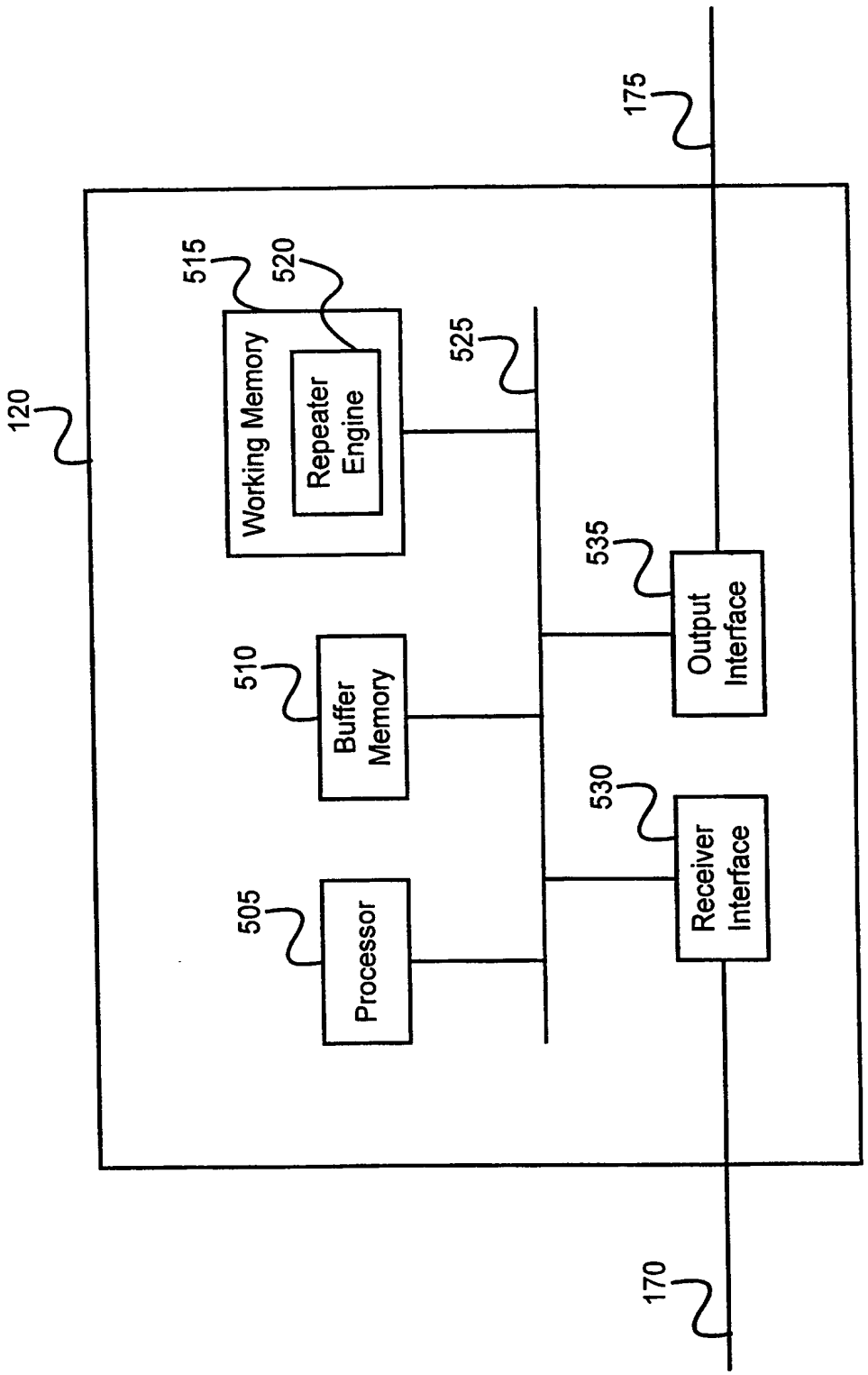


FIG. 5 (Buffer/Repeater)

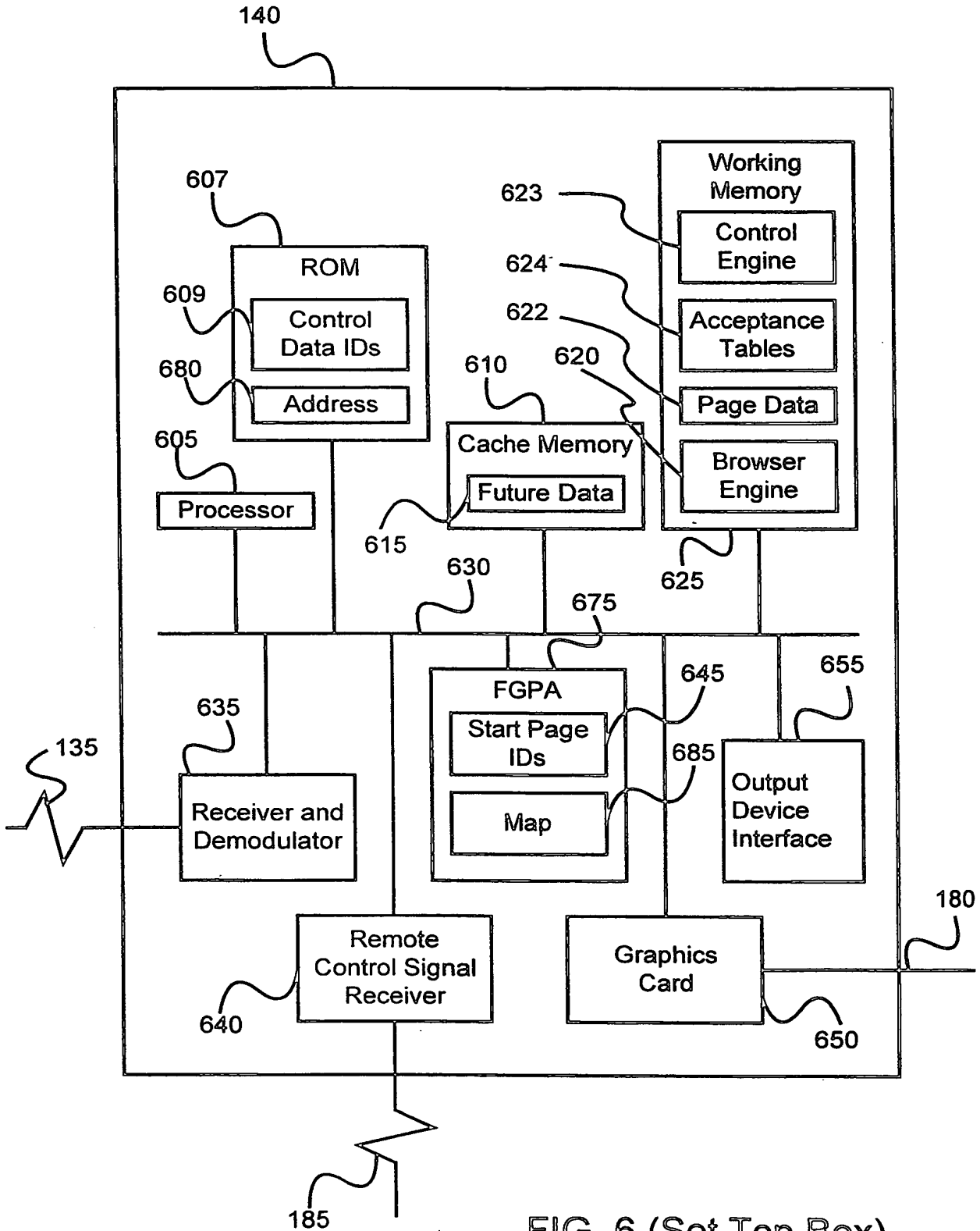


FIG. 6 (Set Top Box)

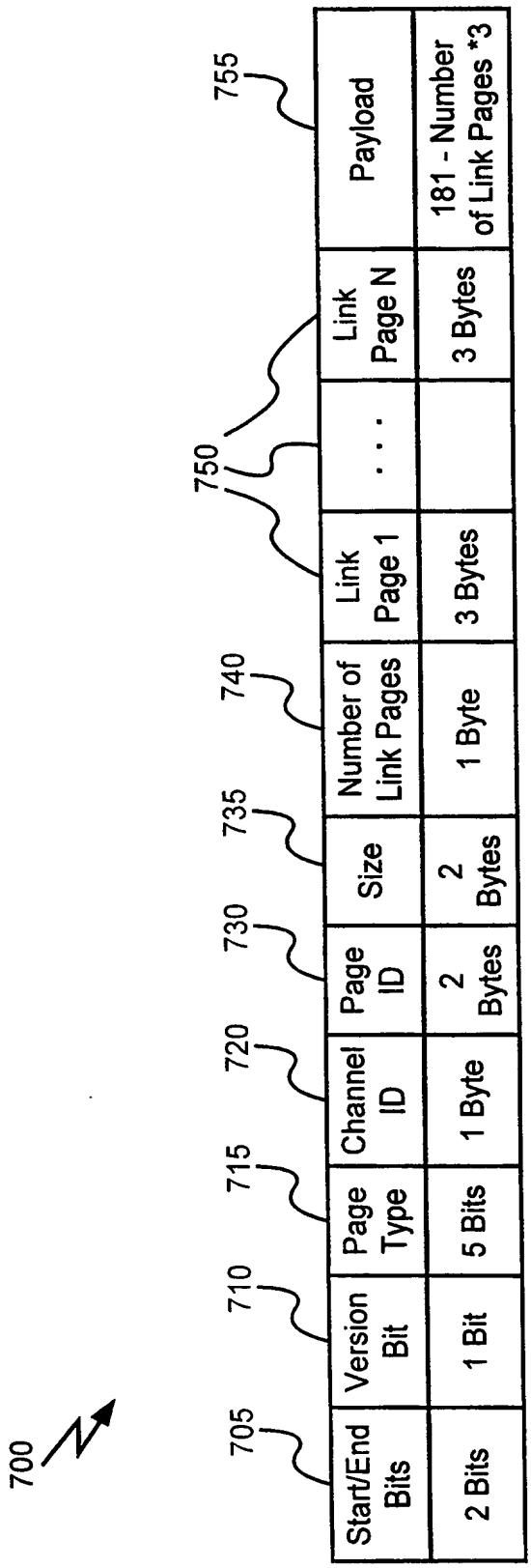


FIG. 7 (Start Page)

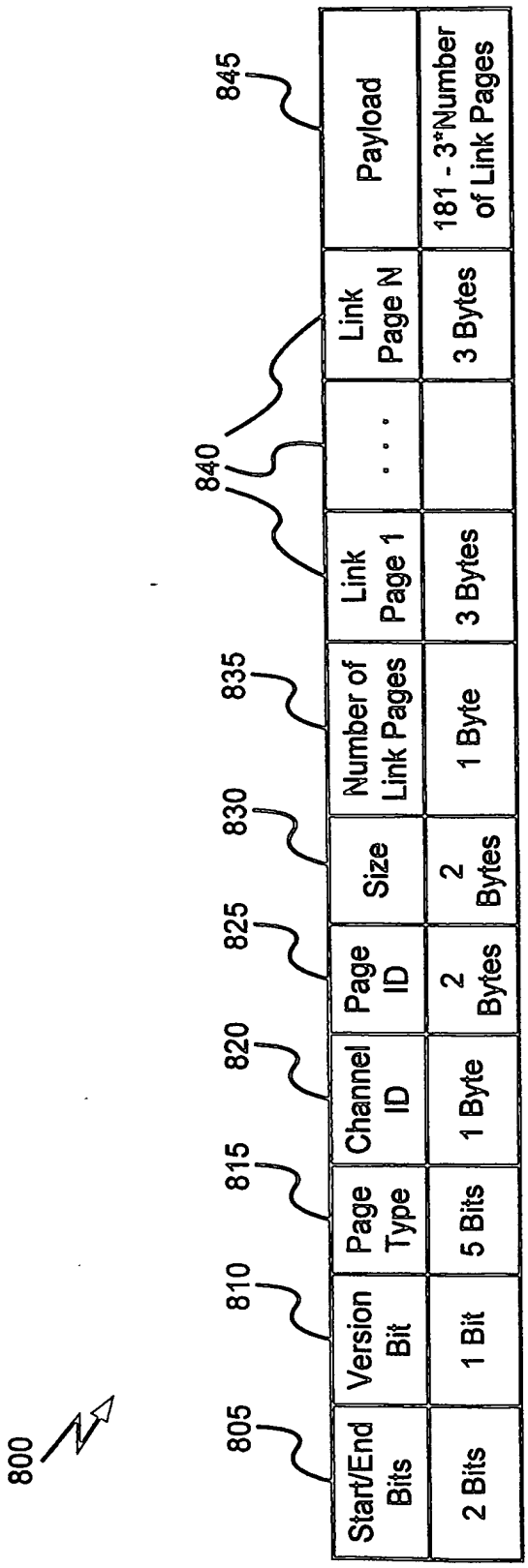


FIG. 8(Content Page - 1st)

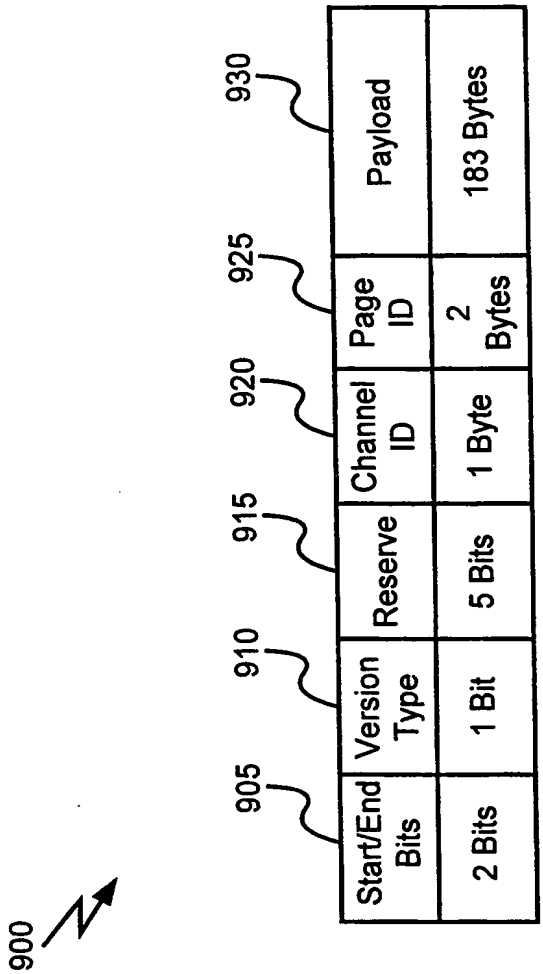


FIG. 9 (Content Page - Others)

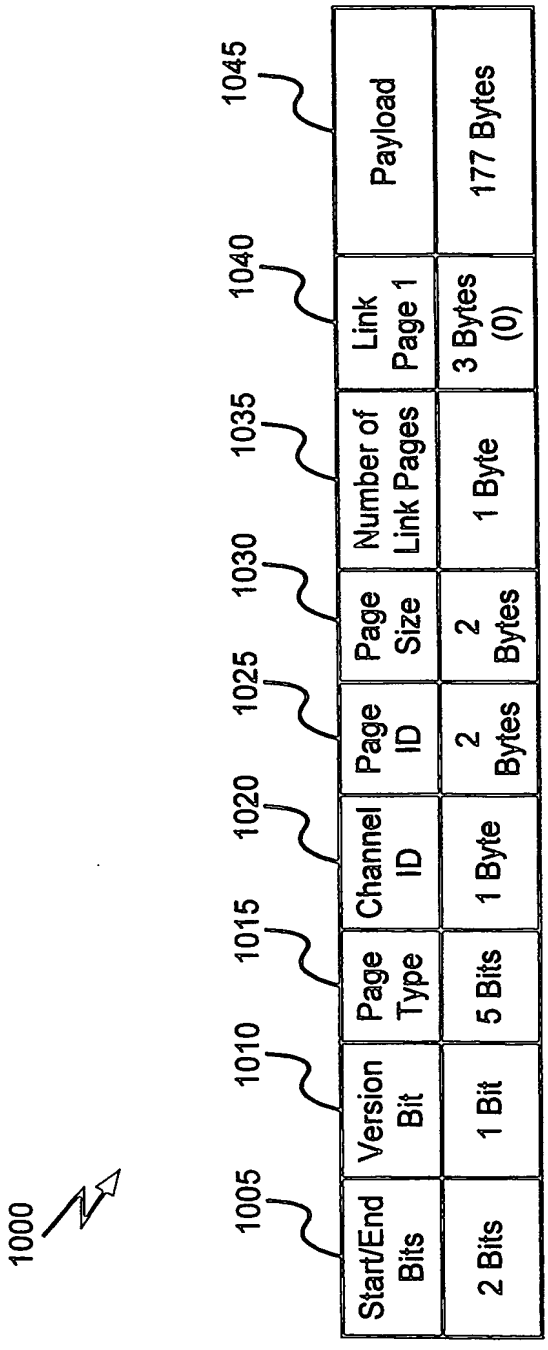


FIG. 10 (Control Page)

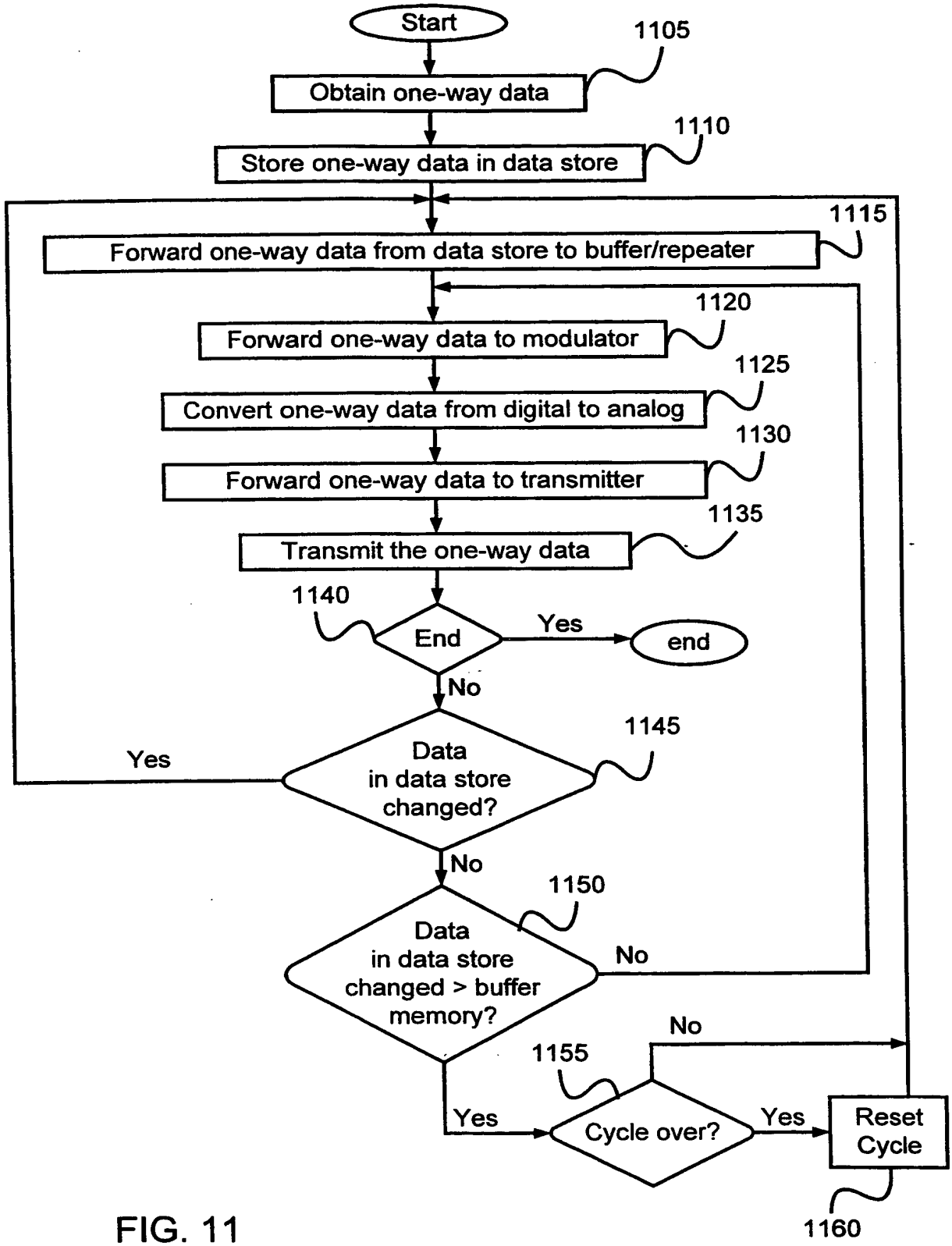

Start
1105
Obtain one-way data
1110
Store one-way data in data store
1115
Forward one-way data from data store to buffer/repeater
1120
Forward one-way data to modulator
1125
Convert one-way data from digital to analog
1130
Forward one-way data to transmitter
1135
Transmit the one-way data
1140
End
Yes
end
No
1145
Data in data store changed?
Yes
No
1150
Data in data store changed > buffer memory?
No
No
1155
Cycle over?
Yes
Yes
Reset Cycle
1160

FIG. 11

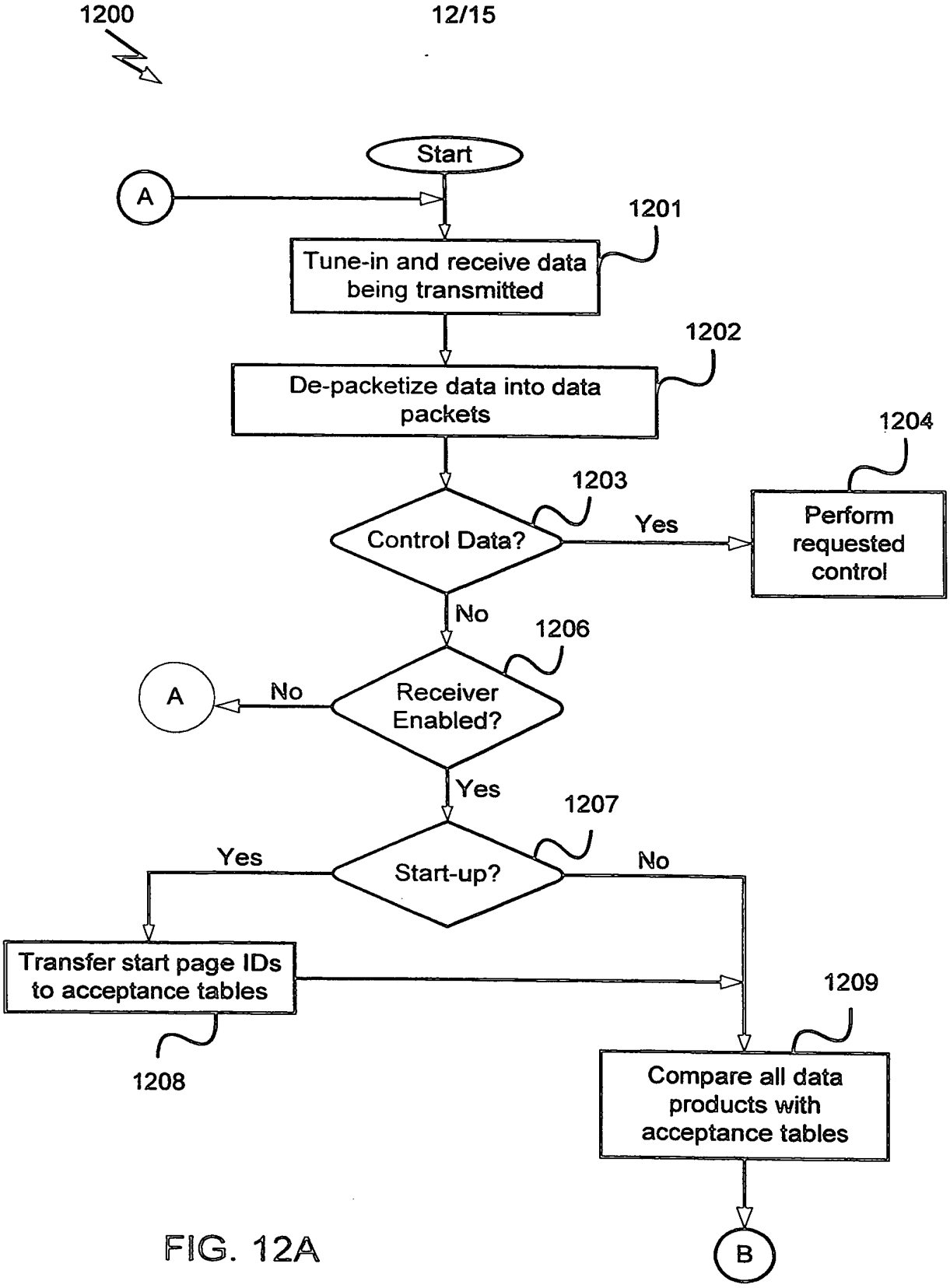

1200
Start
A
1201
Tune-in and receive data being transmitted
1202
De-packetize data into data packets
1204
1203
Control Data?
Yes
Perform requested control
No
1206
A
No
Receiver Enabled?
Yes
1207
Yes
Start-up?
No
Transfer start page IDs to acceptance tables
1208
1209
Compare all data products with acceptance tables
B

FIG. 12A

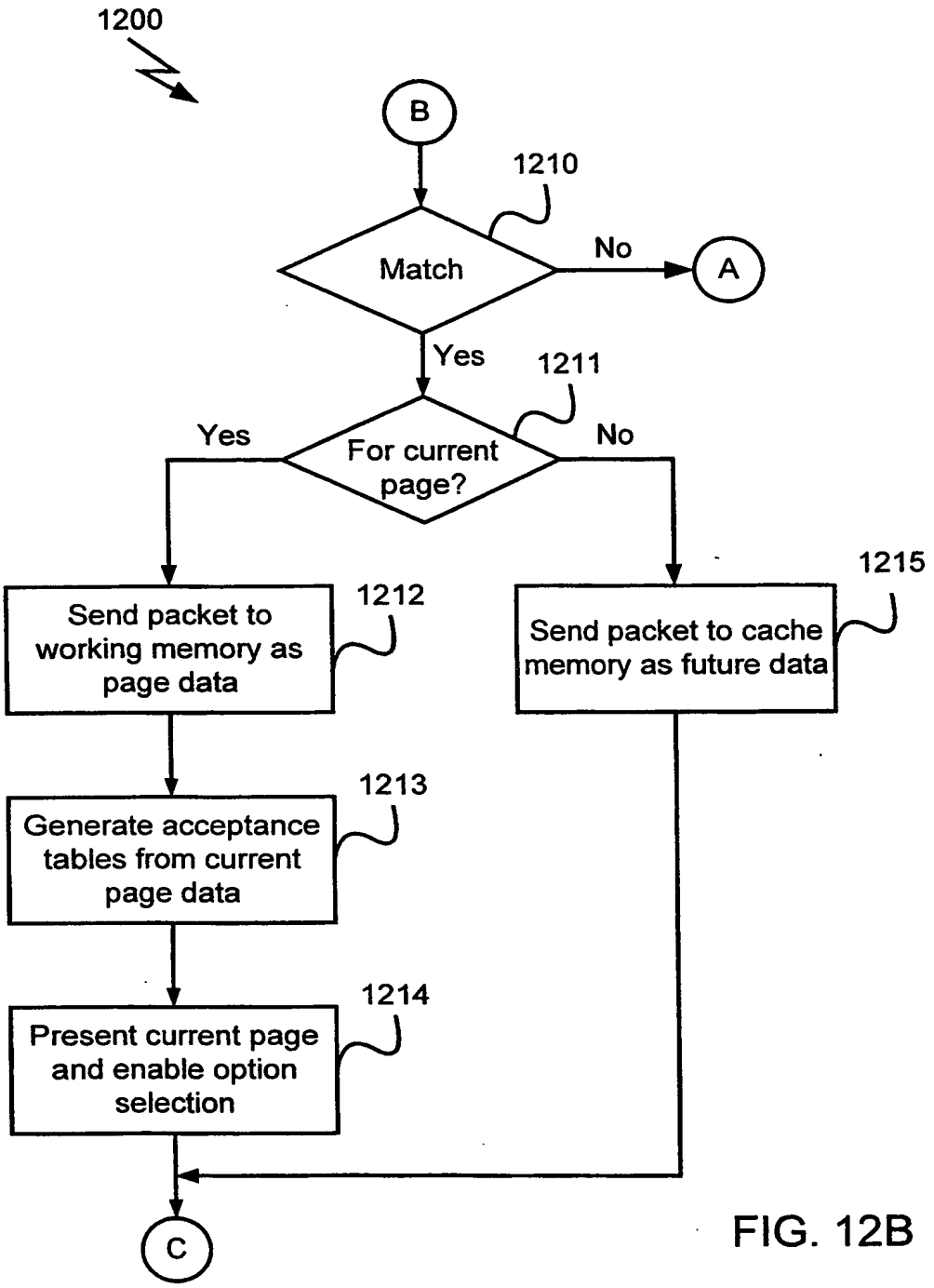

1200
B
1210
Match
No
A
Yes
1211
Yes
For current page?
No
1215
Send packet to working memory as page data
1212
Send packet to cache memory as future data
1213
Generate acceptance tables from current page data
1214
Present current page and enable option selection
C

FIG. 12B

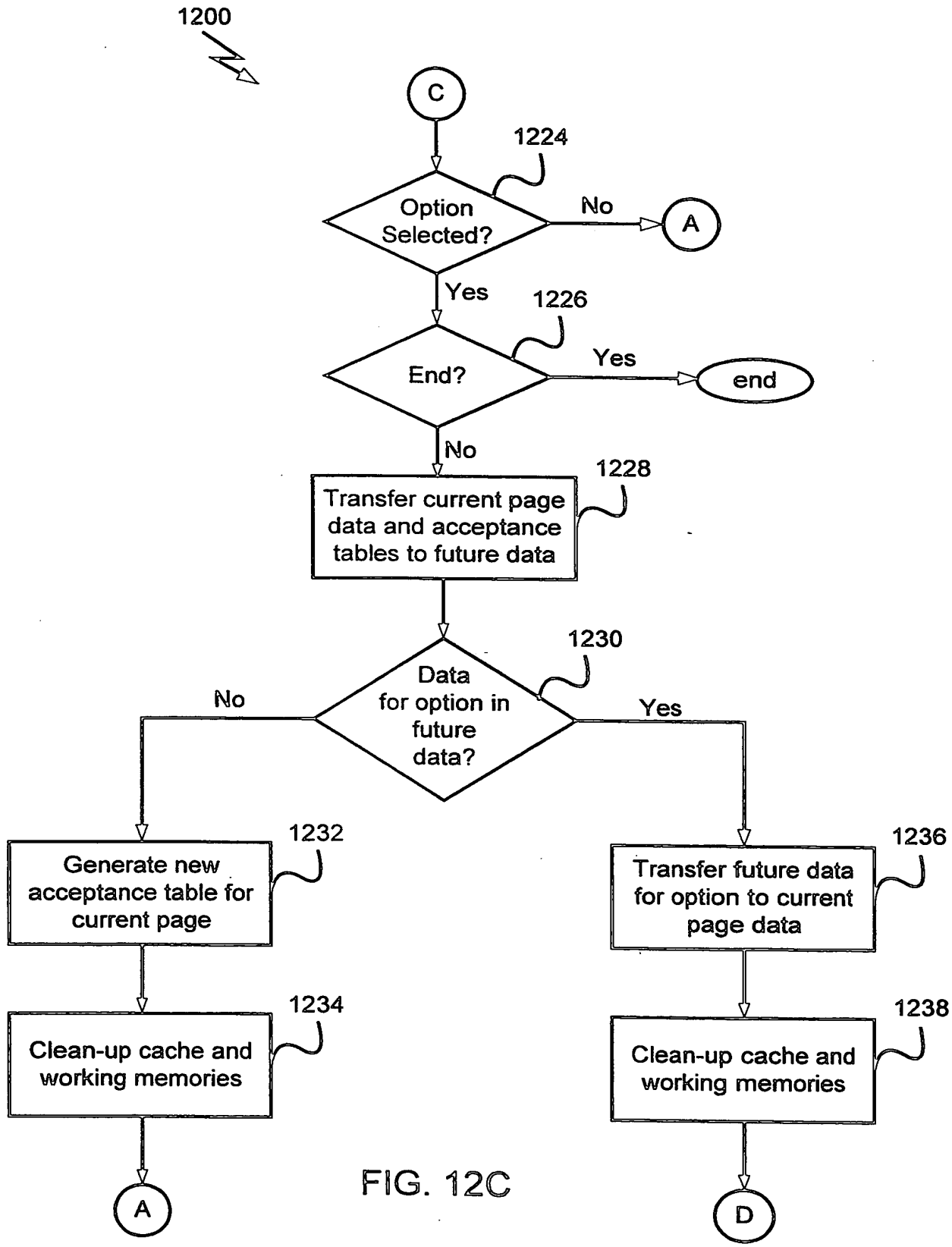


FIG. 12C

BNSDOCID: <WO 0027120A1 | >

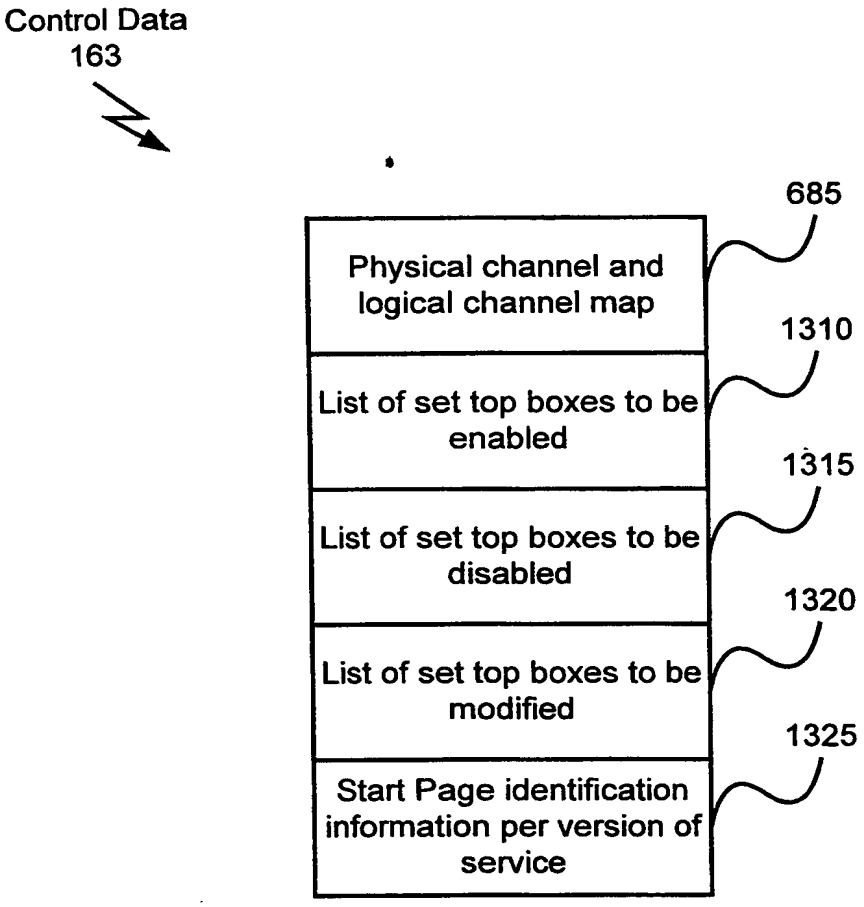

Control Data
163
685
Physical channel and logical channel map
1310
List of set top boxes to be enabled
1315
List of set top boxes to be disabled
1320
List of set top boxes to be modified
1325
Start Page identification information per version of service

FIG. 13

INTERNATIONAL SEARCH REPORT

In ational Application No
PCT/US 99/24861

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04N7/16 H04N7/24 H04N5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	EP 0 827 340 A (MATSUSHITA ELECTRIC IND CO LTD) 4 March 1998 (1998-03-04) abstract column 6, line 15 -column 18, line 5 column 20, line 54 -column 27, line 25 figure 1B figures 3-7 figures 9-11G figures 14-21 --- -/--	1-29, 31-45 30

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 February 2000	17/02/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Hampson, F

1

Form PCT/ISA/210 (second sheet) (July 1992)

BNSDOCID: <WO 0027120A1 >

INTERNATIONAL SEARCH REPORT

In ational Application No
PCT/US 99/24861

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 515 106 A (BRIDGEWATER KEVIN E ET AL) 7 May 1996 (1996-05-07) abstract column 1, line 10 -column 2, line 9 column 2, line 61 -column 8, line 28 figures 1,2,4	1-5, 10-12, 16-20, 26,27, 46-48
X	EP 0 680 185 A (THOMSON CONSUMER ELECTRONICS) 2 November 1995 (1995-11-02) column 3, line 39 -column 4, line 43	46,47
Y	US 5 781 226 A (SHEEHAN PATRICK) 14 July 1998 (1998-07-14)	30
A	column 3, line 12 -column 3, line 19 column 5, line 14 -column 5, line 16 figure 2	28,29
A	PADMANABHAN V N ET AL: "USING PREDICTIVE PREFETCHING TO IMPROVE WORLD WIDE WEB LATENCY" COMPUTER COMMUNICATIONS REVIEW,US,ASSOCIATION FOR COMPUTING MACHINERY. NEW YORK, vol. 26, no. 3, 1 July 1996 (1996-07-01), pages 22-36, XP000607179 ISSN: 0146-4833 abstract page 25, line 5 -page 25, line 22	1-48

1

BNSDOCID: <WO 0027120A1 I >

INTERNATIONAL SEARCH REPORT

Information on patent family members

Ir. ational Application No
PCT/US 99/24861

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0827340 A	04-03-1998	CN 1191449 A	26-08-1998
		JP 10126753 A	15-05-1998
US 5515106 A	07-05-1996	AU 695654 B	20-08-1998
		AU 1521795 A	01-08-1995
		AU 680340 B	24-07-1997
		AU 1598195 A	01-08-1995
		AU 691209 B	14-05-1998
		AU 8157294 A	13-07-1995
		BR 9500013 A	26-09-1995
		BR 9506446 A	02-09-1997
		BR 9506447 A	02-09-1997
		CA 2138603 A	06-07-1995
		CA 2180111 A	13-07-1995
		CA 2180112 A	13-07-1995
		CN 1115950 A	31-01-1996
		CN 1141707 A	29-01-1997
		CN 1141708 A	29-01-1997
		DE 69508553 D	29-04-1999
		DE 69508553 T	15-07-1999
		DE 69512023 D	14-10-1999
		DE 69512023 T	27-01-2000
		EP 0662771 A	12-07-1995
		EP 0738449 A	23-10-1996
		EP 0738450 A	23-10-1996
		EP 0838958 A	29-04-1998
		FI 962756 A	30-07-1996
		FI 962757 A	30-07-1996
		JP 8070451 A	12-03-1996
		JP 9507359 T	22-07-1997
		JP 9507361 T	22-07-1997
		PL 176128 B	30-04-1999
		SG 66236 A	20-07-1999
		TR 28037 A	11-12-1995
		WO 9519091 A	13-07-1995
		WO 9519092 A	13-07-1995
		US 5642153 A	24-06-1997
		US 5867207 A	02-02-1999
EP 0680185 A	02-11-1995	US 5819034 A	06-10-1998
		CA 2145899 A	29-10-1995
		CN 1117620 A	28-02-1996
		JP 8166925 A	25-06-1996
		SG 28257 A	01-04-1996
		US 5915090 A	22-06-1999
US 5781226 A	14-07-1998	NONE	

BNSDOCID: <WO 0027120A1 >